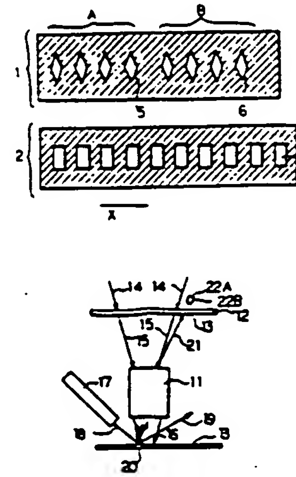
(54) ALIGNMENT SYSTEM
(11) 62-190726 (A) (43) 20.8.1987 (19) JP
(21) Appl. No. 61-32379 (22) 17.2.1986
(71) TOKYO ELECTRON LTD (72) HIROSHI UEHARA
(51) Int. Cl⁴. H01L21/30,G03F9/00,H01L21/68

PURPOSE: To align masks and wafers at a high speed by forming the shape of repetition unit which forms a repetition pattern sequentially in narrower width toward both ends with the center of arranging direction in widest.

CONSTITUTION: The intervals of repetition patterns 1 on a mask and repetition patterns 2 on a wafer are equal. Rhombic window 5, 6 for passing many lights and nontransmission portions are formed at the same interval on the pattern 1 on the mask, and formed by displacing the phases by 1/2 pitch on the portions A, B. The lights emitted from the reflected portion 3 of the pattern 2 on the wafer pass the windows 5, 6 on the mask, the lights passed through the window 5 are detected by a detector 22A, and the light passed through the window 6 are detected by a detector 22B. The pattern 1 on the mask 12 completely coincides in range of the portion A with the pattern 2 on the wafer 13, and is displaced on the portion B. Thus, the output of the detector 22A becomes maximum, and the output of the detector 22B becomes minimum. Thus, since the variation in the potential increases with respect to the relative movements of the mask and the wafer near the "0" potential, they can be aligned accurately at high speed.



(54) TREATMENT OF SEMICONDUCTOR WAFER
(11) 62-190727 (A) (43) 20.8.1987 (19) JP
(21) Appl. No. 61-33233 (22) 17.2.1986
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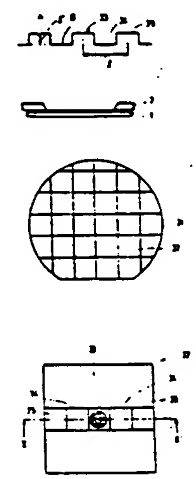
(51) Int. Cl⁴. H01L21/30,G03F9/00,H01L21/68

PURPOSE: To accurately align masks by forming the surface of a semiconductor chip disposed under a Fresnel zone target formed on the mask in a projection or a recess.

CONSTITUTION: The alignment mark 33 of a Fresnel zone target is formed in a predetermined semiconductor chip 32 formed by a scribing line 31. Recess regions 34 and projection regins 35 are repeatedly formed at a pitch l, for example, of 5μm on the periphery of the mark 33. When the size l' from the surface A of the region 34 to the surface B of the region 35 becomes 1/4 λ, where λ is the wavelength of alignment light. Thus, since the light arrived at the surface f a semiconductor wafer 1 through the surface of the mask 2 and reflected on the surface does not partly coincide with the light reflected on the surface of the mask, they do not extremely strengthen nor weaken each other. Therefore, a difficulty of the erasure of the spot of the Fresnel zone target on the mask can be avoided.



(54) METHOD AND APPARATUS FOR MONITORING ETCHING END POINT
(11) 62-190728 (A) (43) 20.8.1987 (19) JP
(21) Appl. No. 61-31783 (22) 18.2.1986
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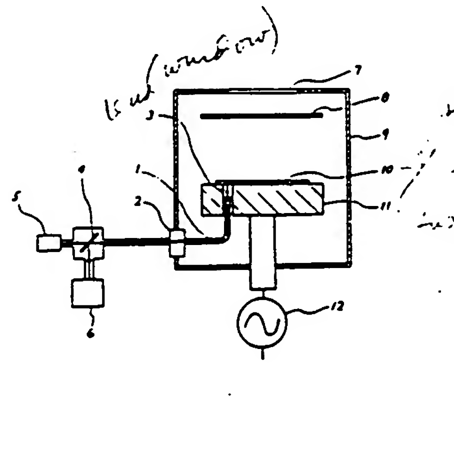
(51) Int. Cl⁴. H01L21/302,C23F1/00,C23F4/00

PURPOSE: To eliminate the influence of contamination of a substance to be etched by introducing an infrared light of a predetermined wavelength to the surface of a semiconductor substrate of the side not formed with a thin metal film of the surface of the substrate, measuring the intensity of the light reflected on the thin film through the substrate of the infrared light, and obtaining the etching end point by the intensity of the reflected light to readily position a detector, thereby improving S/N ratio.

CONSTITUTION: The infrared light of 1.3μm of wavelength modulated by a sinusoidal wave of 1kHz from an infrared light emitting unit 5 is passed through a half mirror 4 to an optical fiber 1, and emitted to a silicon substrate 10 formed with the thin metal film as parallel beam via a rod lens 3. Part of the infrared light of 1.3μm of wavelength is reflected on the back surface of the substrate 10, but is passed through the Si, reflected on the metal film surface, again through the lens 3, and returned to the optical fiber 1. The returned infrared light is reflected on the half mirror 4, and detected by an infrared light detector 6. When the metal film is etched and removed by the plasma, the reflected light is erased from the metal film, thereby notifying the etching end point.



7: window, 8: upper electrode, 9: vacuum tank, 11: lower electrode, 12: RF power source